

REMARKS

The Office Action of December 13, 2010 has been received and carefully considered. New claims 21-22 have been added. No new matter has been added. Claims 3 and 7-18 were previously cancelled. Thus, claims 1-2, 4-6, and 19-22 are currently pending. Reconsideration of the current rejections in the present application is respectfully requested based on the following remarks.<sup>1</sup>

I. THE OBVIOUSNESS REJECTION OF CLAIMS 1, 2, 4-6, 19, and 20

On page 2 of the Office Action, claims 1, 2, 4-6, 19, and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,959,507 to Tanaka et al. ("Tanaka") in view of U.S. Publication No. 2002/0155021 to Nagai et al. ("Nagai"). However, Applicants respectfully traverse this rejection.

Under 35 U.S.C. § 103, the Patent Office bears the burden of establishing a prima facie case of obviousness. In re Fine, 837 F.2d 1071, 1074 (Fed. Cir. 1988). There are four separate

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<sup>1</sup> As Applicants' remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicants' silence as to assertions made by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., assertions regarding dependent claims, whether a reference constitutes prior art, whether references are legally combinable for obviousness purposes) is not a concession by Applicants that such assertions are accurate or such requirements have been met, and Applicants reserve the right to analyze and dispute such in the future.

factual inquiries to consider in making an obviousness determination: (1) the scope and content of the prior art; (2) the level of ordinary skill in the field of the invention; (3) the differences between the claimed invention and the prior art; and (4) the existence of any objective evidence, or "secondary considerations," of non-obviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966); see also KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727 (2007). An "expansive and flexible approach" should be applied when determining obviousness based on a combination of prior art references. KSR, 127 S. Ct. at 1739. However, a claimed invention combining multiple known elements is not rendered obvious simply because each element was known independently in the prior art. Id. at 1741. Rather, there must still be some "reason that would have prompted" a person of ordinary skill in the art to combine the elements in the specific way that he or she did. Id.; In re Icon Health & Fitness, Inc., 496 F.3d 1374, 1380 (Fed. Cir. 2007). Also, modification of a prior art reference may be obvious only if there exists a reason that would have prompted a person of ordinary skill to make the change. KSR, 127 S. Ct. at 1740-41.

Claim 1 expressly recites "reducing a surface roughness of at least one surface of the conductive circuit trace on the surface of the circuit board layer using a smoothing technique

so as to improve performance of a signal transmitted via the conductive circuit trace...wherein the smoothing technique comprises at least one of a lateral smoothing technique and a transverse smoothing technique, the lateral smoothing technique reducing surface roughness in a direction along the conductive circuit trace and the transverse smoothing technique reducing surface roughness in a direction across the conductive circuit trace" (emphasis added). Support for these limitations may be found in at least page 10, line 19 to page 11, line 3 of the Specification. None of the asserted references, alone or in combination, teach at least these limitations.

Tanaka is directed to a bonded ceramic-metal composite substrate, with a focus on production of such substrates. See, e.g., Tanaka, Title; Abstract; col. 1, lines 43-51. Nagai is directed to a copper-allow foil to be used for a laminate sheet, with a focus on bonding the copper-alloy to the laminate sheet. See, e.g., Nagai, Title; Abstract; paragraph [0002]. Although Tanaka and Nagai both teach reduced surface roughness, nothing in either Tanaka or Nagai teaches "a smoothing technique" to "improve performance of a signal transmitted via the conductive circuit trace" and "wherein the smoothing technique comprises at least one of a lateral smoothing technique and a transverse smoothing technique, the lateral smoothing technique reducing

surface roughness in a direction along the conductive circuit trace and the transverse smoothing technique reducing surface roughness in a direction across the conductive circuit trace," as expressly claimed.

These claim limitations highlight new and unexpected results not taught or even contemplated by Tanaka or Nagai. The improvement in the transmitted signal may, in certain instances, result in up to 20% improvement for lateral smoothing while signal improvements resulting from transverse polishing may improve 50% or more. See, e.g., Specification, pages 10-11. At most, Tanaka and Nagai teach nothing more than traditional techniques and focus on their respective purposes of substrate and copper-alloy bonding.

On pages 4-5 of the Office Action, the Office alleges that "polishing laterally or transversely with respect to the circuit pattern are the only two possible directions." However, Applicants respectfully disagree. The Office has not considered the possibility of circular patterns, spiral patterns, diagonal patterns, zig-zag patterns, randomly-generated polishing patterns, etc., which may all have varying effects on signal transmission. Accordingly, the Office's allegation that there are only two possible polishing directions is incorrect and misguided. In fact, the Office Action blatantly ignores the

advantages described in the Specification, which clearly outlines how lateral smoothing results in up to 20% improvement and transverse smoothing results in up to 50% improvement over all other traditional techniques.

Even assuming, for the sake of argument, that these are the only to smoothing possibilities, which Applicants do not so concede, Tanaka and Nagai also do not explicitly teach the claimed smaller surface roughness limitation: "wherein the surface roughness of the at least one surface is reduced to no more than 20 microinches root-mean-squared (RMS)." In fact, as acknowledged by the Office Action, the lowest that can be achieved by either Tanaka or Nagai is 80 microinches root-mean-squared (RMS).

In view of the foregoing, the Office has failed to establish a proper prima facie case of obviousness for at least claim 1.

Regarding claims 2, 4-6, and 19-20, these claims are dependent upon independent claim 1. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988). Thus, since independent claim 1 should be allowable as discussed above, claims 2, 4-6, and 19-20 should also be allowable at least by virtue of their dependency on independent

claim 1.

In view of the foregoing, Applicants respectfully request that the aforementioned rejection of claims 1-2, 4-6, and 19-20 be withdrawn.

New claim 21 recites that "the smoothing technique is a lateral smoothing technique" and new claim 22 recites that "the smoothing technique is a transverse smoothing technique." None of the cited references teach the use of any one of these techniques, which the Office has readily acknowledged in the Office Action.

In view of the foregoing, Applicants respectfully submit that claims 21-22 are allowable over Tanaka and Nagai.

II. CONCLUSION

In view of the foregoing, Applicants respectfully submit that the present application is in condition for allowance, and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed telephone number, in order to expedite resolution of any issues and to expedite passage of the present application to issue, if any comments, questions, or suggestions arise in connection with the present application.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0206, and please credit any excess fees to the same deposit account.

Respectfully submitted,

Hunton & Williams LLP

Date: 3/14/11

By: 

Thomas E. Anderson

Registration No. 37,063

TEA/GYW

Hunton & Williams LLP  
1900 K Street, N.W.  
Washington, D.C. 20006-1109  
Telephone: (202) 955-1500  
Facsimile: (202) 778-2201